dosage of CY. Three to 6 days after completion of the second course (given as consolidation), three of these patients, while aplastic, developed HC. In two patients hematuria resolved after 10–14 days. In the third patient the clinical picture persisted unmodified for 10 days, and the patient died while still aplastic. Several urine samples were obtained at different time during the HC episode from each patient; all were BKV DNA positive by dot blot hybridization assay using a digoxigenin-labeled DNA probe [2].

Several reports describe cases of late HC associated with BKV viruria in bone marrow transplantation (BMT) patients [2,3]. BKV reactivations characterized by viruria have been demonstrated in more than 50% of BMT recipients, but 24% developed only HC [2]. Thus it has been hypothesized that in addition to BKV infection other factors, including the conditioning regimen, are responsible for HC.

This is the first observation of HC associated with BKV viruria in patients with refractory or relapsed ALL receiving the Hi-COAP regimen. The frequency of BKV viruria in patients with relapsed ALL is unknown. We detected three cases of BKV viruria because of HC occurrence, but we do not know if there were BKV excretors among the other 53 patients. On the other hand, all 55 patients received the same Hi-COAP regimen. The lack of MESNA prophylaxis and the early occurrence of HC after the completion of the second Hi-COAP course could suggest that in these patients tissue damage by CY has a role in causing HC. In addition, the simultaneous recovery from HC and aplasia in the patients who survived could suggest a role for cellular immunity in the control of BKV infection, leading to recovery.

MESNA prophylaxis and therapy with prostaglandin E_2, as previously reported [4], should be considered.

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Idiopathic Myelofibrosis With Unusually High Erythroblastosis in the Peripheral Blood

To the Editor: Idiopathic myelofibrosis was originally described by Heuck [1] in 1879 under the title "Two cases of leukemia and peculiar blood and bone marrow findings." This disease is a chronic myeloproliferative disorder characterized by splenomegaly, immature granulocytes and erythroblasts in the blood, distorted tear drop-shaped red cells, and marrow fibrosis [2]. Although a variety of blood counts and morphologies have been reported [3–5], we describe here the first case of idiopathic myelofibrosis associated with an unusually high number of mature erythroblasts in the peripheral blood. In addition, the peripheral erythroblast count reversibly paralleled the size of the liver and spleen.

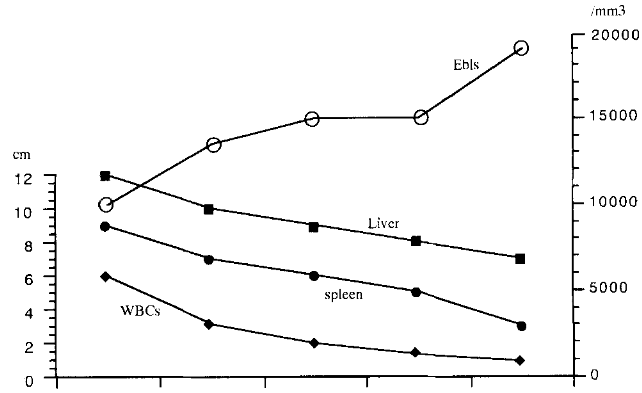

Fig. 1. Mature erythroblasts (Ebls) appeared in the peripheral blood and increased gradually up to 20,000/mm³. Reduction of both liver and spleen sizes (in cm) and reduction of white blood cell (WBCs) count are also shown.

In January 1990 a 65-year-old Japanese man was hospitalized because of right central retinal vein occlusion. Idiopathic myelofibrosis was diagnosed after a series of studies. Hydroxyurea effectively controlled his condition. In June 1995, the patient complained of fever (38°C), and abdominal distention. He had hepatosplenomegaly, but no lymphadenopathy. Laboratory studies revealed the following: erythrocyte sedimentation rate, 28 mm/hr; hematocrit, 36%; hemoglobin, 10.5 gm/dl; erythroblasts, 15,800/mm³; white blood cell count, 6,400/mm³; and platelet count of 64,000/mm³. The peripheral blood picture showed normocytic-normochromic anemia, anisocytosis, poikilocytosis, polychromatic cells, and tear drop-shaped red cells. Myeloblast count was 3%, promyelocytes and myelocytes did not exceed 1%, and giant platelets appeared in the peripheral blood smear. Platelet function tests revealed defective platelet aggregation to collagen. Tumor markers were all negative. Neutrophil alkaline phosphatase rate was 44%, and the score was 101. Computed tomographic scans of the abdomen revealed huge hepatosplenomegaly.

Repeated bone marrow aspirations were dry taps. The bone marrow biopsy was hypocellular and cytogenetically normal (46XY). Hematoxylin and eosin stains of the biopsy showed collagen fibrosis. Silver stains showed an increase in reticulin fibers. Erythroid cells were normal in number. Both myeloid and megakaryocytic series showed signs of dysplasia. The treatment of the patient included hydroxyurea, cytosine arabinoside, and daunorubicin. Clinically, the patient's general condition improved. Both liver and spleen sizes decreased gradually and significantly from 12 to 7 cm and from 9 to 3 cm, respectively, in the subcostal mid-clavicular lines. Interestingly, mature erythroblasts appearing in the peripheral blood increased gradually with reduction of both liver and spleen sizes; erythroblasts also reached up to 20,000/mm³ in the peripheral blood (Fig. 1).

This is the first case of idiopathic myelofibrosis associated with a very high number of erythroblasts in the peripheral blood, which also paralleled the size of the liver and spleen. The mechanism that resulted in shifting of erythroblasts to the peripheral blood and its relation to the size of both liver and spleen remain obscure. Possible mechanisms include changes of the microenvironmental conditions of both liver and spleen, and alteration

of the adherent molecules on erythroblasts. Further studies are needed to clarify this point.

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Leukoerythroblastosis Following the Use of G-CSF

To the Editor: We read with great interest the letter presenting a case of pseudoleukemia following the use of granulocyte colony-stimulating factor (G-CSF) by Reykdal et al. in the July 1995, issue of the *American Journal of Hematology* [1]. Increase in the count of both mature and immature forms of neutrophils with certain changes in morphology is the expected impact of G-CSF on the peripheral blood. Although early precursors of the myeloid lineage such as myelocytes, promyelocytes, and even blasts have been readily observed on peripheral blood smears after G-CSF treatment, a full-blown picture of leukoerythroblastosis has not so far been reported [1,2].

We present here a patient with acute myelomonocytic leukemia (AML-M4) who has exhibited a leukoerythroblastic blood picture after the administration of G-CSF. A 48-year-old male patient was admitted to the hospital with gingival hypertrophy and constitutional symptoms of abrupt onset. Laboratory work-up revealed a white blood cell count of 96.8×10^9/L, erythrocyte sedimentation rate of 78 mm/hr and serum lactate dehydrogenase level of 1,581 U/L; the remaining biochemical parameters were within normal limits. Peripheral smear yielded a differential count of 84% blasts, 2% promyelocytes, 2% metamyelocytes, 5% bands, 2% polymorphonuclear leukocytes, and 5% lymphocytes with normal erythrocyte morphology and abundant thrombocytes. Blastic infiltration was noted on morphological examination of bone marrow aspirate and biopsy. Leukemic cells exhibited positive reactions to cytochemical stains of periodic acid-Schiff, peroxidase, chloroacetate esterase, and α-naphthyl esterase. The diagnosis of AML-M4 was confirmed by means of immunological phenotyping; the blasts were found to be 80% positive for CD14, 53% for CD13, and 65% for HLA-DR and negative for CD3, CD20, CD10, and TdT. Remission was achieved with a course of mitoxantrone (16 mg/m^2, days 1 and 2) and cytosine arabinoside (400 mg/m^2, days 1–5). He experienced a severe episode of neutropenic fever unresponsive to empirical antibiotic therapy, which would resolve only with the administration of amphotericin B. A second course of chemotherapy consisting of the same agents was given. The patient developed neutropenic fever 4 days after the completion of chemotherapy and was given empirical amikacin and ceftazidime, which proved effective. Concomitantly, recombinant human G-CSF treatment was instituted, 5 µg/kg daily as intravenous infusion over 30 minutes. The white

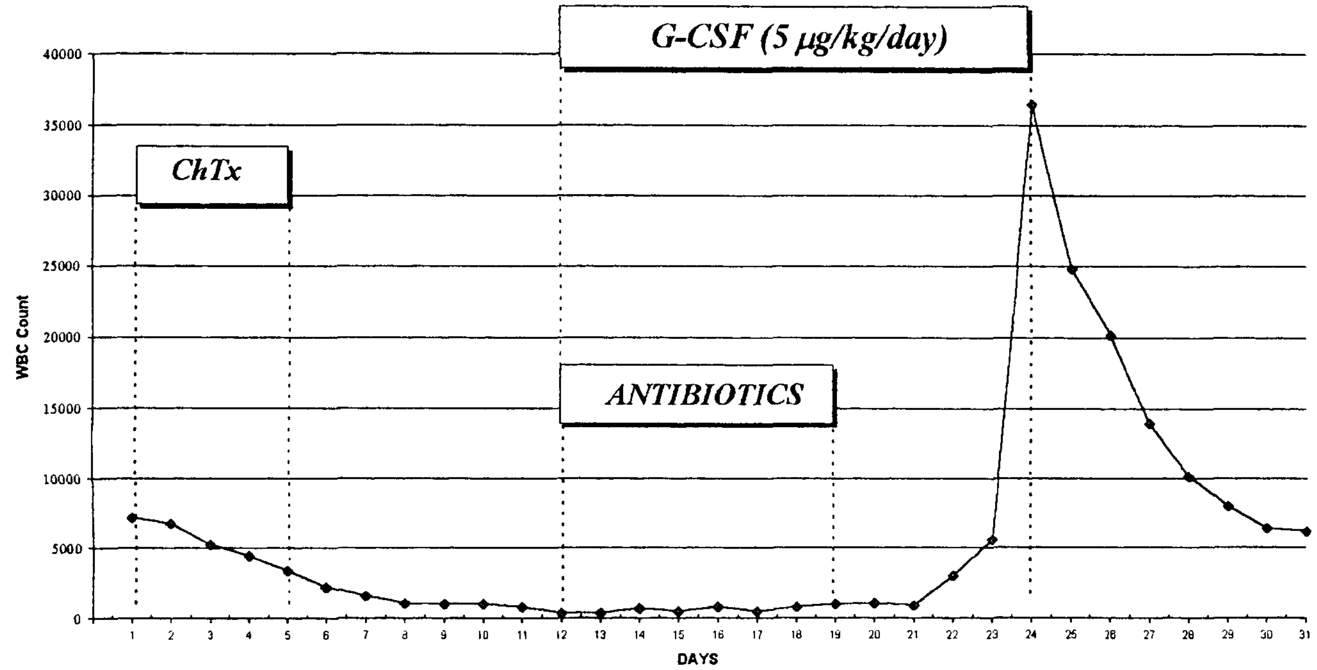

Fig. 1. White blood cell (WBC) count of the patient in relation to chemotherapy (ChTx) and G-CSF administration.